

Advances in Intelligent Systems and Computing

189

Editor-in-Chief

Prof. Janusz Kacprzyk
Systems Research Institute
Polish Academy of Sciences
ul. Newelska 6
01-447 Warsaw
Poland
E-mail: kacprzyk@ibspan.waw.pl

For further volumes:
<http://www.springer.com/series/11156>

Álvaro Herrero, Václav Snášel, Ajith Abraham,
Ivan Zelinka, Bruno Baruque, Héctor Quintián,
José Luis Calvo, Javier Sedano,
and Emilio Corchado (Eds.)

International Joint Conference
CISIS'12
ICEUTE'12
SOCO'12 Special Sessions



Springer

Editors

Álvaro Herrero
Department of Civil Engineering
University of Burgos
Burgos
Spain

Václav Snášel
VŠB-TU Ostrava
Ostrava
Czech Republic

Ajith Abraham
Machine Intelligence Research Labs
(MIR Labs)
Scientific Network for Innovation
and Research Excellence
Auburn, Washington
USA

Ivan Zelinka
VŠB-TU Ostrava
Ostrava
Czech Republic

Bruno Baroque
Department of Civil Engineering
University of Burgos
Burgos
Spain

Héctor Quintián
Universidad de Salamanca
Salamanca
Spain

José Luis Calvo
University of Coruña
Ferrol, A Coruña
Spain

Javier Sedano
Instituto Tecnológico de Castilla y León
Lopez Bravo 70, Pol. Ind. Villalonquéjar
Burgos
Spain

Emilio Corchado
Universidad de Salamanca
Salamanca
Spain

ISSN 2194-5357

ISBN 978-3-642-33017-9

DOI 10.1007/978-3-642-33018-6

Springer Heidelberg New York Dordrecht London

Library of Congress Control Number: 2012945518

e-ISSN 2194-5365

e-ISBN 978-3-642-33018-6

© Springer-Verlag Berlin Heidelberg 2013

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed. Exempted from this legal reservation are brief excerpts in connection with reviews or scholarly analysis or material supplied specifically for the purpose of being entered and executed on a computer system, for exclusive use by the purchaser of the work. Duplication of this publication or parts thereof is permitted only under the provisions of the Copyright Law of the Publisher's location, in its current version, and permission for use must always be obtained from Springer. Permissions for use may be obtained through RightsLink at the Copyright Clearance Center. Violations are liable to prosecution under the respective Copyright Law.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

While the advice and information in this book are believed to be true and accurate at the date of publication, neither the authors nor the editors nor the publisher can accept any legal responsibility for any errors or omissions that may be made. The publisher makes no warranty, express or implied, with respect to the material contained herein.

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Preface

This volume of Advances in Intelligent and Soft Computing contains accepted papers presented at CISIS 2012 and ICEUTE 2012, both conferences held in the beautiful and historic city of Ostrava (Czech Republic), in September 2012.

CISIS aims to offer a meeting opportunity for academic and industry-related researchers belonging to the various, vast communities of **Computational Intelligence**, **Information Security**, and **Data Mining**. The need for intelligent, flexible behaviour by large, complex systems, especially in mission-critical domains, is intended to be the catalyst and the aggregation stimulus for the overall event.

After a thorough peer-review process, the CISIS 2012 International Program Committee selected 30 papers which are published in these conference proceedings achieving an acceptance rate of 40%.

In the case of ICEUTE 2012, the International Program Committee selected 4 papers which are published in these conference proceedings.

The selection of papers was extremely rigorous in order to maintain the high quality of the conference and we would like to thank the members of the Program Committees for their hard work in the reviewing process. This is a crucial process to the creation of a high standard conference and the CISIS and ICEUTE conferences would not exist without their help.

CISIS 2012 and ICEUTE 2012 enjoyed outstanding keynote speeches by distinguished guest speakers: Prof. Ponnuthurai Nagarathnam Suganthan, Prof. Jeng-Shyang Pan, Prof. Marios M. Polycarpou, Prof. Fanny Klett and Mr. Milan Kladnıcek.

For this special edition, as a follow-up of the conference, we anticipate further publication of selected papers in a special issue of the prestigious Logic Journal of the IGPL Published by Oxford Journals.

Particular thanks go as well to the Conference main Sponsors, IT4Innovations, VŠB-Technical University of Ostrava, IEEE.- Systems, Man and Cybernetics Society CzechoSlovakia, IEEE.- Systems, Man and Cybernetics Society Spain, MIR labs, Spanish Association for Artificial Intelligence and IFCOLOG.

We would like to thank all the special session organizers, contributing authors, as well as the members of the Program Committees and the Local Organizing Committee for their hard and highly valuable work. Their work has helped to contribute to the success of the CISIS 2012 and ICEUTE 2012 events.

September, 2012

Álvaro Herrero
Václav Snášel
Ajith Abraham
Ivan Zelinka
Bruno Baruque
Héctor Quintián
José Luis Calvo
Javier Sedano
Emilio Corchado

CISIS 2012

Organization

General Chair

| | |
|-----------------|--------------------------------|
| Emilio Corchado | University of Salamanca, Spain |
|-----------------|--------------------------------|

International Advisory Committee

| | |
|-------------------|--|
| Ajith Abraham | Machine Intelligence Research Labs - MIR Labs, Europe |
| Antonio Bahamonde | President of the Spanish Association for Artificial Intelligence, AEPIA |
| Michael Gabbay | Kings College London, UK |

Program Committee Chair

| | |
|-----------------|--|
| Álvaro Herrero | University of Burgos, Spain |
| Václav Snasel | VSB-Technical University of Ostrava, Czech Republic |
| Ajith Abraham | VSB-Technical University of Ostrava, Czech Republic |
| Ivan Zelinka | VSB-Technical University, Ostrava, Czech Republic |
| Emilio Corchado | University of Salamanca, Spain |

Program Committee

| | |
|----------------------------|--|
| Alain Lamadrid Vallina | Department of High Education, Cuba |
| Alberto Peinado Domínguez | University of Malaga, Spain |
| Alessandro Zanassi | Bocconi University, Italy |
| Amparo Fúster Sabater | CSIC, Spain |
| Ana Isabel González-Tablas | Carlos III of Madrid University, Spain |
| Andre CPLF de Carvalho | University of São Paulo, Brazil |
| Andrés Correal Cuervo | University of Boyacá, Colombia |
| Ángel Arroyo | University of Burgos, Spain |

| | |
|----------------------------|---|
| Ángel Grediaga Olivo | University of Alicante, Spain |
| Ángel Martín del Rey | University of Salamanca, Spain |
| Ángela I. Barbero Díez | University of Valladolid, Spain |
| Antoni Bosch Pujol | Autonomous University of Barcelona, Spain |
| Antonino Santos de Riego | University of La Coruña, Spain |
| Antonio J. Tomeu Hardasmal | University of Cadiz, Spain |
| Antonio Maña Gómez | University of Malaga, Spain |
| Antonio Zamora Gómez | University of Alicante, Spain |
| Araceli Queiruga Dios | University of Salamanca, Spain |
| Arturo Ribagorda Garnacho | Carlos III of Madrid University, Spain |
| Belén Vaquerizo | University of Burgos, Spain |
| Benjamín Ramos Alvarez | Carlos III of Madrid University, Spain |
| Bernardete Ribeiro | University of Coimbra, Portugal |
| Borja Sanz Urquijo | University of Deusto, Spain |
| Bruno Baruque | University of Burgos, Spain |
| Candelaria Hernández Goya | University of La Laguna, Spain |
| Carlos Laorden | University of Deusto, Spain |
| Carlos Marcelo Martínez | |
| Cagnazzo | University of La República, Uruguay |
| Carlos Munuera Gómez | University of Valladolid, Spain |
| Carlos Pereira | Universidade de Coimbra, Portugal |
| César Hervás-Martínez | University of Córdoba, Spain |
| Chelo Malagón Poyato | CSIC, Spain |
| Claudio Jorge Felizia | University of Buenos Aires, Argentina |
| Constantino Malagón Luque | University Antonio de Nebrija, Spain |
| Cristina Alcaraz Tello | University of Malaga, Spain |
| Daniel Sadornil Renedo | University of Cantabria, Spain |
| Danilo Pástor Ramírez | Politechnic High School of Chimborazo, Ecuador |
| Dario Forte | University of Milano Crema, Italy |
| David García Rosado | University of Castilla la Mancha, Spain |
| Davide Anguita | University of Genova, Italy |
| Davide Leoncini | University of Genova, Italy |
| Debasis Giri | Haldia Institute of Technology, India |
| Diego Avila Pesantez | Higher Polytechnic School of Chimborazo, Ecuador |
| Domingo Gómez Pérez | University of Cantabria, Spain |
| Edgar Martínez Moro | University of Valladolid, Spain |
| Eduardo Carozo Blumsztein | University of Montevideo, Uruguay |
| Eduardo Fernández-Medina | |
| Patón | University of Castilla la Mancha, Spain |
| Edwin Mamani Zeballos | Military School of Engineering, Bolivia |
| Enrico Appiani | Elsag Datamat, Italy |
| Enrique Daltabuit | National Autonomous of México University, México |
| Enrique De la Hoz | University of Alcalá, Spain |

| | |
|---------------------------------|---|
| Enrique González Jiménez | Autonomous University of Madrid, Spain |
| Eva Volna | University of Ostrava, Czech Republic |
| Fabián Velásquez Clavijo | University of los Llanos, Colombia |
| Fausto Montoya Vitini | Institute of Applied Physics, CSIC, Spain |
| Federico García Crespí | Miguel Hernández University, Spain |
| Felipe Andrés Corredor Chavarro | University of los Llanos, Colombia |
| Fernando Piera Gómez | Computer Technicians Association, ATI, Spain |
| Fernando Tricas García | University of Zaragoza, Spain |
| Filip Merhaut | Getmore s.r.o. |
| Francisco Fernández-Navarro | University of Córdoba, Spain |
| Francisco Herrera | University of Granada, Spain |
| Francisco José Navarro Ríos | University of Granada, Spain |
| Francisco Plaza | University of Salamanca, Spain |
| Francisco Rodríguez Henríquez | CINVESTAV IPN, México |
| Francisco Valera Pintor | Carlos III of Madrid University, Spain |
| Gabriel Díaz Orueta | UNED, Spain |
| Gabriel López Millán | University of Murcia, Spain |
| Gerald Schaefer | Loughborough University, UK |
| Gerardo Rodríguez Sánchez | University of Salamanca, Spain |
| Gonzalo Alvarez Marañón | CSIC, Spain |
| Gonzalo Martínez Ginesta | Alfonso X University, Spain |
| Guillermo Morales-Luna | CINVESTAV, Mexico |
| Gustavo Adolfo Isaza Echeverry | University of Caldas, Colombia |
| Hector Alaiz | University of León, Spain |
| Héctor Quintián | University of Salamanca, Spain |
| Hugo Pagola | University of Buenos Aires, Argentina |
| Hujun Yin | University of Manchester, UK |
| Ignacio Arenaza | University of Mondragon, Spain |
| Ignacio Luengo Velasco | Complutense de Madrid University, Spain |
| Igor Santos Grueiro | University of Deusto, Spain |
| Isaac Agudo Ruiz | University of Malaga, Spain |
| Ivonne Valeria Muñoz Torres | ITESM, México |
| Janusz Kacprzyk | Systems Research Institute Polish Academy of Sciences, Poland |
| Javier Areitio Bertolín | University of Deusto, Spain |
| Javier Carbó Rubiera | Carlos III of Madrid University, Spain |
| Javier Fernando Castaño Forero | University of los Llanos, Colombia |
| Javier Nieves Acedo | University of Deusto, Spain |
| Javier Sánchez-Monedero | University of Córdoba, Spain |
| Javier Sedano | Instituto tecnológico de Castilla y León, Spain |
| Jesús Esteban Díaz Verdejo | University of Granada, Spain |
| Jesús María Minguet Melián | UNED, Spain |
| Jirí Dvorsky | VSB-Technical University of Ostrava, Czech Republic |

| | |
|-------------------------------|---|
| Joan Borrel Viader | Autonomous University of Barcelona, Spain |
| Joan-Josep Climent | University of Alicante, Spain |
| Joaquín García-Alfaro | Carleton University, Canada |
| Jordi Herrera Joancomarti | Autonomous University of Barcelona, Spain |
| Jorge Díez Pelaéz | University of Oviedo, Spain |
| Jorge Eduardo Sznæk | Nacional del Comahue University, Argentina |
| Jorge López Hernández-Ardieta | Carlos III of Madrid University, Spain |
| Jorge Ramió Aguirre | Universidad Politécnica de Madrid, Spain |
| Jose A. Onieva | University of Málaga, Spain |
| José Ángel Domínguez Pérez | University of Salamanca, Spain |
| José Antonio Montenegro | |
| Montes | University of Malaga, Spain |
| José Antonio. Onieva | University of Málaga, Spain |
| José Daniel Britos | National University of Córbona, Argentina |
| José de Jesús Angel Angel | CINVESTAV IPN, México |
| José Esteban Saavedra López | University of Oruro, Bolivia |
| José Francisco Martínez | INAOE, Mexico |
| José Francisco Vicent Francés | University of Alicante, Spain |
| Jose L. Salmeron | Pablo Olavide University, Spain |
| José Luis Calvo | University of A Coruña, Spain |
| José Luis Ferrer Gomila | University of Islas Baleares, Spain |
| José Luis Imaña | Complutense de Madrid University, Spain |
| José Luis Rivas López | University of Vigo, Spain |
| José Luis Salazar Riaño | University of Zaragoza, Spain |
| José Manuel Benitez | University of Granada, Spain |
| José Manuel Molina | Carlos III of Madrid University, Spain |
| Jose María Gómez Hidalgo | Optenet, Spain |
| Josep Conde Colom | Lleida University, Spain |
| Josep Rifá Coma | Autonomous University of Barcelona, Spain |
| Jouni Lampinen | University of Vaasa, Finland |
| Juán Á. Muñoz | University of Almería, Spain |
| Juan C. Fernández | University of Córdoba, Spain |
| Juan Guillermo Lalinde-Pulido | EAFIT University, Colombia |
| Juan Jesús Barbarán Sánchez | University of Granada, Spain |
| Juan José del Coz Velasco | University of Oviedo, Spain |
| Juan José Ortega Daza | University of Malaga, Spain |
| Juan Manuel Corchado | University of Salamanca, Spain |
| Juan Manuel García García | Morelia Technologic Institute, Mexico |
| Juán Manuel González Nieto | Queensland University of Technologic, Australia |
| Juan Pedro Hecht | University of Buenos Aires, Argentina |
| Juan Tapiador | University of York, UK |
| Juan Tena Ayuso | University of Valladolid, Spain |
| Judith Redi | Delft University of Technology, The Netherlands |
| Juha Karhunen | Helsinki University of Technology, Finland |
| Julio Cesar Hernandez Castro | University of Portsmouth, UK |

| | |
|--|---|
| Leandro Tortosa Grau | University of Alicante, Spain |
| Leocadio González | University of Almería, Spain |
| Leocadio González | University of Almería, Spain |
| Leticia Curiel | University of Burgos, Spain |
| Lídice Romero Amondaray | Oriente University, Cuba |
| Llorenç Huguet Rotguer | University of Islas Baleares, Spain |
| Lorenzo M. Martínez Bravo | University of Extremadura, Spain |
| Luis Alberto Pazmiño Proaño | Católica del Ecuador Pontifical University, Ecuador |
| Luis Eduardo Meléndez Campis | Tecnológico Comfenalco University Foundation, Colombia |
| Luis Enrique Sánchez Crespo | University of Castilla la Mancha, Spain |
| Luis Hernández Encinas | CSIC, Spain |
| M ^a Magdalena Payeras Capellà | University of Balearic Islands, Spain |
| Macià Mut Puigserver | University of Balearic Islands, Spain |
| Manuel Angel Serrano Martín | University of Castilla la Mancha, Spain |
| Manuel Graña | University of Pais Vasco, Spain |
| Manuel Jacinto Martínez | Ibermática, Spain |
| Manuel Mollar Villanueva | Jaume I University, Spain |
| Marcia Mut Puigserver | University of Islas Baleares, Spain |
| Marcos Gestal Pose | University of La Coruña, Spain |
| María Victoria López López | Complutense de Madrid University, Spain |
| Mariemma I. Yagüe del Valle | University of Málaga, Spain |
| Mario Andrés del Riego | University of la República, Uruguay |
| Mario Farias-Elinos | La Salle University, Mexico |
| Mario Gerardo Piattini Velthuis | University of Castilla la Mancha, Spain |
| Mario Mastriani | GIIT-ANSES, Argentina |
| Mauricio Ochoa Echeverría | University of Boyacá, Colombia |
| Miguel Angel Borges Trenard | University of Oriente, Cuba |
| Milos Kudelka | VSB-Technical University of Ostrava, Czech Republic |
| Nicolás C.A. Antezana Abarca | San Pablo Catholic University, Peru |
| Oplatkova Oplatkova | VSB-Technical University of Ostrava, Czech Republic |
| Óscar Agudelo Rojas | National University of Colombia, Colombia |
| Óscar Cánovas Reverte | University of Murcia, Spain |
| Óscar Luaces | University of Oviedo, Spain |
| Paolo Gastaldo | University of Genova, Italy |
| Paul Mantilla | Católica del Ecuador Pontifical University, Ecuador |
| Pavel Kromer | VSB-Technical University of Ostrava, Czech Republic |
| Pedro A. Gutiérrez | University of Córdoba, Spain |
| Pedro Pablo Pinacho Davidson | University of Santiago de Chile, Chile |
| Peter Roberts | UCINF University, Chile |

| | |
|---------------------------------|--|
| Petro Gopych | V.N. Karazin Kharkiv National University, Ukraine |
| Pino Caballero Gil | University of La Laguna, Spain |
| Rafael Álvarez | University of Alicante, Spain |
| Rafael Calzada Pradas | Carlos III of Madrid University, Spain |
| Rafael Corchuelo | University of Sevilla, Spain |
| Rafael Martínez Gasca | University of Sevilla, Spain |
| Ramón Rizo Aldeguer | University of Alicante, Spain |
| Ramón Torres Rojas | Marta Abreu de Las Villas Central University, Cuba |
| Raquel Redondo | University of Burgos, Spain |
| Raúl Durán Díaz | University of Alcalá, Spain |
| Reinaldo Nicolás Mayol Arnao | University of Los Andes, Venezuela |
| Ricardo Contreras Arriagada | University of Concepción, Chile |
| Ricardo Llamasa-Villalba | Industrial University of Santander, Colombia |
| Richard Duro | University of La Coruña, Spain |
| Roberto Gómez Cárdenas | ITESM, México |
| Roberto Hiribarne Guedes | Marta Abreu de Las Villas Central University, Cuba |
| Roberto Uribeetxeberria | University of Mondragon, Spain |
| Rodolfo Zunino | University of Genova, Italy |
| Rodrigo Adolfo Cofré Loyola | Católica del Maule University, Chile |
| Roman Jašek | Tomas Bata University in Zlin, Czech Republic |
| Roman Senkerik | Tomas Bata University in Zlin, Czech Republic |
| Rosanna Costaguta | National University of Santiago del Estero, Argentina |
| Rosaura Palma Orozco | CINVESTAV IPN, México |
| Rubén Vázquez Medina | National Polytechnic Institute, Mexico |
| Salvador Alcaraz Carrasco | Miguel Hernández University, Spain |
| Santiago Martín Acurio Del Pino | Católica del Ecuador Pontifical University, Ecuador |
| Seema Verma | Banasthali University, India |
| Sergi Robles Martínez | Autonomous University of Barcelona, Spain |
| Sergio Bravo Silva | University of Bío Bío, Chile |
| Sergio Decherchi | University of Genova, Italy |
| Sergio Pozo Hidalgo | University of Sevilla, Spain |
| Sorin Stratulat | University Paul Verlaine - Metz, France |
| Tomás Jiménez García | University of Murcia, Spain |
| Tzai-Der Wang | Cheng Shiu University, Taiwan |
| Urko Zurutuza Ortega | University of Mondragon, Spain |
| Valentina Casola | University of Naples Federico II, Italy |
| Vincenzo Mendillo | Central University of Venezuela, Venezuela |
| Vladimir Cobarrubias Llanten | University of Chile, Chile |
| Wei Wang | University of Luxembourg, Luxembourg |
| Wenjian Luo | University of Science and Technology of China, China |
| Wilfred Torres Moya | Andrés Bello Catholic University, Venezuela |
| Wiltord Pedrycz | University of Alberta, Canada |

Xiangliang Zhang

King Abdullah Univ. of Science and Technology,
Saudi Arabia

Xiuzhen Chen

ParisTech, France

Zuzana Oplatkova

Tomas Bata University in Zlin, Czech Republic

Special Sessions

Intelligent Network Security and Survivability

Andrzej Kasprzak

Wroclaw University of Technology, Poland

Krzysztof Walkowiak

Wroclaw University of Technology, Poland

Leszek Koszałka

Wroclaw University of Technology, Poland

Michał Woźniak

Wroclaw University of Technology, Poland

Bartosz Krawczyk

Wroclaw University of Technology, Poland

Bartosz Kurlej

Wroclaw University of Technology, Poland

Jacek Rak

Gdansk University of Technology, Poland

Marcin Zmyslony

Wroclaw University of Technology, Poland

Mariusz Kozioł

Wroclaw University of Technology, Poland

Michał Choras

University of Technology and Life Sciences,
Poland

Michał Kucharzak

Wroclaw University of Technology, Poland

Miroslaw Klinkowski

National Institute of Telecommunications, Poland

Robert Burduk

Wroclaw University of Technology, Poland

Teresa Gomes

University of Coimbra, Portugal

Tomasz Kajdanowski

Wroclaw University of Technology, Poland

Wojciech Kmiecik

Wroclaw University of Technology, Poland

Text Processing Applications to Secure and Intelligent Systems

Pablo G. Bringas

University of Deusto, Spain

Igor Santos

University of Deusto, Spain

Xabier Ugarte-Pedrero

University of Deusto, Spain

Carlos Laorden

University of Deusto, Spain

David Barroso Berrueta

University of Deusto, Spain

Felix Brezo

University of Deusto, Spain

Igor Ruiz-Agúndez

University of Deusto, Spain

Jose Maria Gómez Hidalgo

Optenet

Juan Álvaro Muñoz Naranjo

University of Almería, Spain

Paolo Fosci

Università di Bergamo, Italy

Pedram Hayati

University of Western Australia, Australia

Simone Mutti

Università degli Studi di Bergamo, Italy

Vidyasagar Potdar

University of Western Australia, Australia

Organising Committee

| | |
|-----------------------|---|
| Václav Snášel - Chair | VSB-Technical University of Ostrava, Czech Republic, (Chair) |
| Jan Platoš | VSB-Technical University of Ostrava, Czech Republic (Co-chair) |
| Pavel Krömer | VSB-Technical University of Ostrava, Czech Republic (Co-chair) |
| Katerina Kasparova | VSB-Technical University of Ostrava, Czech Republic |
| Hussein Soori | VSB-Technical University of Ostrava, Czech Republic |
| Petr Berek | VSB-Technical University of Ostrava, Czech Republic |

ICEUTE 2012

Organization

International Advisory Committee

| | |
|-------------------|---|
| Jean-Yves Antoine | Université François Rabelais, France |
| Reinhard Baran | Hamburg University of Applied Sciences, Germany |
| Fernanda Barbosa | Instituto Politécnico de Coimbra, Portugal |
| Bruno Baruke | University of Burgos, Spain |
| Emilio Corchado | University of Salamanca, Spain |
| Wolfgang Gerken | Hamburg University of Applied Sciences, Germany |
| Arnaud Giacometti | Université François Rabelais, France |
| Helga Guincho | Instituto Politécnico de Coimbra, Portugal |
| Álvaro Herrero | University of Burgos, Spain |
| Patrick Marcel | Université François Rabelais, France |
| Gabriel Michel | University Paul Verlaine - Metz, France |
| Viorel Negru | West University of Timisoara, Romania |
| Jose Luis Nunes | Instituto Politécnico de Coimbra, Portugal |
| Salvatore Orlando | Ca' Foscari University, Italy |
| Veronika Peralta | Université François Rabelais, France |
| Carlos Pereira | Instituto Politécnico de Coimbra, Portugal |
| Teppo Saarenpää | Turku University of Applied Sciences, Finland |
| Sorin Stratulat | University Paul Verlaine - Metz, France |

Program Committee Chair

| | |
|-----------------|--|
| Václav Snasel | VSB-Technical University of Ostrava, Czech Republic |
| Bruno Baruke | University of Burgos, Spain |
| Álvaro Herrero | University of Burgos, Spain |
| Ajith Abraham | VSB-Technical University of Ostrava, Czech Republic |
| Emilio Corchado | University of Salamanca, Spain |

Program Committee

| | |
|------------------------|--|
| Agostino Cortesi | Ca' Foscari University, Italy |
| Ana Borges | Instituto Politécnico de Coimbra, Portugal |
| Anabela de Jesus Gomes | Instituto Politécnico de Coimbra, Portugal |
| Anabela Panão Ramalho | Instituto Politécnico de Coimbra, Portugal |

| | |
|-----------------------------|--|
| Ángel Arroyo | University of Burgos, Spain |
| Antonio José Mendes | University of Coimbra, Portugal |
| Arnaud Giacometti | Université François Rabelais, France |
| Begoña Prieto | University of Burgos, Spain |
| Belén Vaquerizo | University of Burgos, Spain |
| Carlos López | University of Burgos, Spain |
| Carlos Pereira | Instituto Politécnico de Coimbra, Portugal |
| César Hervás-Martínez | University of Córdoba, Spain |
| Claudio Silvestri | Ca' Foscari University, Italy |
| David Fairen-Jimenez | The University of Edinburgh, UK |
| Dominique Laurent | Cergy-Pontoise University, France |
| Dragan Simic | Novi Sad University, Serbia |
| Elisabeth Delozanne | Université Pierre et Marie Curie Paris, France |
| Fernanda Barbosa | Instituto Politécnico de Coimbra, Portugal |
| Fernando López | University of La Coruña, Spain |
| Francisco Duarte | Instituto Politécnico de Coimbra, Portugal |
| Francisco Fernández-Navarro | University of Córdoba, Spain |
| Francisco Leite | Instituto Politécnico de Coimbra, Portugal |
| François Bret | Université François Rabelais, France |
| Gabriel Michel | University Paul Verlaine - Metz, France |
| Héctor Quintián | University of Salamanca, Spain |
| Helga Guincho | Instituto Politécnico de Coimbra, Portugal |
| Hujun Yin | University of Manchester, UK |
| Ivan Zelinka | VSB-Technical University of Ostrava, Czech Republic |
| Javier Bajo | Pontifical University of Salamanca, Spain |
| Javier Barcenilla | University Paul Verlaine - Metz, France |
| Javier Sánchez-Monedero | University of Córdoba, Spain |
| Javier Sedano | Instituto tecnológico de Castilla y León, Spain |
| Jean-Yves Antoine | Université François Rabelais, France |
| Jiří Dvorský | VSB-Technical University of Ostrava, Czech Republic |
| Joaquín Pacheco | University of Burgos, Spain |
| Jon Mikel Zabala | Lund University, Sweden |
| Jorge Barbosa | Instituto Politécnico de Coimbra, Portugal |
| José Luis Calvo | University of A Coruña, Spain |
| Jose Luis Nunes | Instituto Politécnico de Coimbra, Portugal |
| Juan C. Fernández | University of Córdoba, Spain |
| Juan Manuel Corchado | University of Salamanca, Spain |
| Juan Pavón | Complutense University of Madrid, Spain |
| Konrad Jackowski | Wroclaw University of Technology, Poland |
| Leonel Morgado | University of Trás-os-Montes e Alto Douro, Portugal |
| Leticia Curiel | University of Burgos, Spain |
| Lourdes Sáiz | University of Burgos, Spain |

María José Marcelino
 Michał Wozniak
 Miguel Ángel Manzanedo
 Milos Kudelka

Nicoletta Cocco
 Nuno Ferreira
 Patrick Marcel
 Pavel Krömer

Pedro A. Gutiérrez
 Rafael Corchuelo
 Raúl Marticorena
 Reinhard Baran
 Richard Duro
 Robin Vivian
 S. Hariharan
 Salvatore Orlando
 Shanmugasundaram Hariharan
 Sorin Stratulat
 Teppo Saarenpää
 Thomas Connolly

Veronika Peralta
 Viorel Negru
 Wolfgang Gerken
 Zdenek Tronicek

University of Coimbra, Portugal
 Wroclaw University of Technology, Poland
 University of Burgos, Spain
 VSB-Technical University of Ostrava,
 Czech Republic
 Ca' Foscari University, Italy
 Instituto Politécnico de Coimbra, Portugal
 Université François Rabelais, France
 VSB-Technical University of Ostrava,
 Czech Republic
 University of Córdoba, Spain
 University of Seville, Spain
 University of Burgos, Spain
 Hamburg University of Applied Sciences, Germany
 University of La Coruña, Spain
 University Paul Verlaine - Metz, France
 JJ College of Engineering and Technology, India
 Ca' Foscari University, Italy
 Bharathiar University, India
 University Paul Verlaine - Metz, France
 Turku University of Applied Sciences, Finland
 University of the West of Scotland,
 United Kingdom
 Université François Rabelais, France
 West University of Timisoara, Romania
 Hamburg University of Applied Sciences, Germany
 Czech Technical University in Prague,
 Czech Republic

Organising Committee

Václav Snášel - Chair

Jan Platoš

Pavel Krömer

Katerina Kasparova

Hussein Soori

Petr Berek

VSB-Technical University of Ostrava,
 Czech Republic (Chair)
 VSB-Technical University of Ostrava,
 Czech Republic (Co-chair)
 VSB-Technical University of Ostrava,
 Czech Republic (Co-chair)
 VSB-Technical University of Ostrava,
 Czech Republic
 VSB-Technical University of Ostrava,
 Czech Republic
 VSB-Technical University of Ostrava,
 Czech Republic

SOCO 2012

Organization

General Chair

Emilio Corchado

University of Salamanca, Spain

International Advisory Committee

Ashraf Saad

Armstrong Atlantic State University, USA

Amy Neustein

Linguistic Technology Systems, USA

Ajith Abraham

Machine Intelligence Research Labs - MIR Labs,
Europe

Jon G. Hall

The Open University, UK

Paulo Novais

Universidade do Minho, Portugal

Antonio Bahamonde

President of the Spanish Association for Artificial
Intelligence, AEPIA

Michael Gabbay

Kings College London, UK

Isidro Laso-Ballesteros

European Commission Scientific Officer, Europe

Aditya Ghose

University of Wollongong, Australia

Saeid Nahavandi

Deakin University, Australia

Henri Pierreval

LIMOS UMR CNRS 6158 IFMA, France

Industrial Advisory Committee

Rajkumar Roy

The EPSRC Centre for Innovative Manufacturing
in Through-life Engineering Services, UK

Amy Neustein

Linguistic Technology Systems, USA

Jaydip Sen

Innovation Lab, Tata Consultancy Services Ltd.,
India

Program Committee Chair

Emilio Corchado

University of Salamanca, Spain

Václav Snášel

VSB-Technical University of Ostrava,
Czech Republic

Ajith Abraham

VSB-Technical University of Ostrava,
Czech Republic

Special Sessions

Soft Computing Models for Control Theory & Applications in Electrical Engineering

| | |
|--------------------|---|
| Pavel Brandstetter | VSB - Technical University of Ostrava, Czech Republic (Co-chair) |
| Emilio Corchado | University of Salamanca, Spain (Co-chair) |
| Daniela Perdukova | Technical University of Kosice, Slovak Republic |
| Jaroslav Timko | Technical University of Kosice, Slovak Republic |
| Jan Vittek | University of Zilina, Slovak Republic |
| Jaroslava Zilkova | Technical University of Kosice, Slovak Republic |
| Jiri Koziorek | VSB - Technical University of Ostrava, Czech Republic |
| Libor Stepanec | UniControls a.s., Czech Republic |
| Martin Kuchar | UniControls a.s., Czech Republic |
| Milan Zalman | Slovak University of Technology, Slovak Republic |
| Pavel Brandstetter | VSB - Technical University of Ostrava, Czech Republic |
| Pavol Fedor | Technical University of Kosice, Slovak Republic |
| Petr Palacky | VSB - Technical University of Ostrava, Czech Republic |
| Stefan Kozak | Slovak University of Technology, Slovak Republic |

Soft Computing Models for Biomedical Signals and Data Processing

| | |
|----------------|--|
| Lenka Lhotská | Czech Technical University, Czech Republic (Co-chair) |
| Martin Macaš | Czech Technical University, Czech Republic (Co-chair) |
| Miroslav Burša | Czech Technical University, Czech Republic (Co-chair) |

| | |
|----------------------|--|
| Chrysostomos Stylios | TEI of Epirus, Greece |
| Dania Gutiérrez Ruiz | Cinvestav, Mexico |
| Daniel Novak | Czech Technical University, Czech Republic |
| George Georgoulas | TEI of Epirus, Greece |
| Michal Huptych | Czech Technical University, Czech Republic |
| Petr Posik | Czech Technical University, Czech Republic |
| Vladimir Krajca | Czech Technical University, Czech Republic |

Advanced Soft Computing Methods in Computer Vision and Data Processing

| | |
|------------------|--|
| Irina Perfilieva | University of Ostrava, Czech Republic (Co-chair) |
| Vilém Novák | University of Ostrava, Czech Republic (Co-chair) |
| Antonín Dvořák | University of Ostrava, Czech Republic |
| Marek Vajgl | University of Ostrava, Czech Republic |
| Martin Štěpnička | University of Ostrava, Czech Republic |
| Michal Holcapek | University of Ostrava, Czech Republic |
| Miroslav Pokorný | University of Ostrava, Czech Republic |
| Pavel Vlašánek | University of Ostrava, Czech Republic |
| Petr Hurtík | University of Ostrava, Czech Republic |
| Petra Hodáková | University of Ostrava, Czech Republic |
| Petra Murinová | University of Ostrava, Czech Republic |
| Radek Valášek | University of Ostrava, Czech Republic |
| Viktor Pavliska | University of Ostrava, Czech Republic |

Organising Committee

| | |
|-----------------------|---|
| Václav Snášel - Chair | VSB-Technical University of Ostrava, Czech Republic (Chair) |
| Jan Platoš | VSB-Technical University of Ostrava, Czech Republic (Co-chair) |
| Pavel Krömer | VSB-Technical University of Ostrava, Czech Republic (Co-chair) |
| Katerina Kasparova | VSB-Technical University of Ostrava, Czech Republic |
| Hussein Soori | VSB-Technical University of Ostrava, Czech Republic |
| Petr Berek | VSB-Technical University of Ostrava, Czech Republic |

CSIS 12

icEUTE

International Conference

SOCO

Soft Computing Models in Industrial
and Environmental Applications

Contents

CISIS 2012

General Track

Applications of Intelligent Methods for Security

| | |
|--|---|
| Automatic Analysis of Web Service Honeypot Data Using Machine Learning Techniques | 1 |
|--|---|

Abdallah Ghourabi, Tarek Abbes, Adel Bouhoula

| | |
|---|----|
| A Security Pattern-Driven Approach toward the Automation of Risk Treatment in Business Processes | 13 |
|---|----|

Angel Jesus Varela-Vaca, Robert Warschofsky, Rafael M. Gasca, Sergio Pozo, Christoph Meinel

| | |
|---|----|
| Neural Network Ensembles Design with Self-Configuring Genetic Programming Algorithm for Solving Computer Security Problems | 25 |
|---|----|

Eugene Semenkin, Maria Semenkina, Ilia Panfilov

| | |
|---|----|
| Clustering for Intrusion Detection: Network Scans as a Case of Study | 33 |
|---|----|

Raúl Sánchez, Álvaro Herrero, Emilio Corchado

| | |
|--|----|
| Sensor Networks Security Based on Sensitive Robots Agents: A Conceptual Model | 47 |
|--|----|

Camelia-M. Pintea, Petrica C. Pop

Infrastructure and Network Security

| | |
|---|----|
| Comments on a Cryptosystem Proposed by Wang and Hu | 57 |
|---|----|

R. Durán Díaz, L. Hernández Encinas, J. Muñoz Masqué

| | |
|---|----|
| Equivalent Inner Key Recovery Attack to NMAC | 67 |
|---|----|

Fanbao Liu, Changxiang Shen, Tao Xie

| | |
|---|-----|
| Hybrid Compression of the Aho-Corasick Automaton for Static Analysis in Intrusion Detection Systems | 77 |
| <i>Ciprian Pungila</i> | |
| Tracking Traitors in Web Services via Blind Signatures | 87 |
| <i>J.A. Álvarez-Bermejo, J.A. López-Ramos</i> | |
| C&C Techniques in Botnet Development | 97 |
| <i>Félix Brezo, José Gaviria de la Puerta, Igor Santos, David Barroso, Pablo Garcia Bringas</i> | |
| How Political Illusions Harm National Stability: Fiscal Illusion as a Source of Taxation | 109 |
| <i>Paulo Mourao, José Pedro Cabral</i> | |
| Software Implementation of Linear Feedback Shift Registers over Extended Fields | 117 |
| <i>O. Delgado-Mohatar, A. Fúster-Sabater</i> | |
| Simulation Analysis of Static and Dynamic Intermediate Nodes and Performance Comparison of MANETS Routing Protocols | 127 |
| <i>Jahangir Khan, Zoran Bojkovic, Syed Irfan Hayder, Gulam Ali Mallah, Abdul Haseeb, Fariha Atta</i> | |
| On Fitness Function Based upon Quasigroups Power Sequences | 141 |
| <i>Eliška Ochodková, Jiří Dvorský, Pavel Krömer, Pavel Tuček</i> | |
| Investigation on Operating Systems Identification by Means of Fractal Geometry and OS Pseudorandom Number Generators | 151 |
| <i>Ivan Zelinka, Filip Merhaut, Lenka Skanderova</i> | |
| Usability of Software Intrusion-Detection System in Web Applications | 159 |
| <i>Radek Vala, David Malaník, Roman Jašek</i> | |
| Special Sessions | |
| Intelligent Network Security and Survivability | |
| A Genetic Algorithm for Solving RSA Problem in Elastic Optical Networks with Dedicated Path Protection | 167 |
| <i>Miroslaw Klinkowski</i> | |
| Correlation Approach for SQL Injection Attacks Detection | 177 |
| <i>Michał Choraś, Rafał Kozik, Damian Puchalski, Witold Hołubowicz</i> | |
| Information Exchange Mechanism between Federated Domains: P2P Approach | 187 |
| <i>Michał Choraś, Rafał Kozik, Rafał Renk, Witold Hołubowicz</i> | |

| | |
|---|-----|
| Web Spam Detection Using MapReduce Approach to Collective Classification | 197 |
| <i>Wojciech Indyk, Tomasz Kajdanowicz, Przemysław Kazienko, Sławomir Plamowski</i> | |
| Analysis of Selected Aspects of “IBM I” Security | 207 |
| <i>Maciej Piec, Iwona Poźniak-Koszalka, Mariusz Koziół</i> | |
| Metaheuristic Approach for Survivable P2P Multicasting Flow Assignment in Dual Homing Networks | 215 |
| <i>Wojciech Kmiecik, Krzysztof Walkowiak</i> | |
| A Tabu Search Algorithm for Optimization of Survivable Overlay Computing Systems | 225 |
| <i>Krzysztof Walkowiak, Wojciech Charewicz, Maciej Donajski, Jacek Rak</i> | |
| Greedy Algorithms for Network Anomaly Detection | 235 |
| <i>Tomasz Andrysiak, Łukasz Saganowski, Michał Choraś</i> | |
| Combined Classifiers with Neural Fuser for Spam Detection | 245 |
| <i>Marcin Zmyślony, Bartosz Krawczyk, Michał Woźniak</i> | |
| Combined Bayesian Classifiers Applied to Spam Filtering Problem | 253 |
| <i>Karol Wrótniak, Michał Woźniak</i> | |
| Text Processing Applications to Secure and Intelligent Systems | |
| Negobot: A Conversational Agent Based on Game Theory for the Detection of Paedophile Behaviour | 261 |
| <i>Carlos Laorden, Patxi Galán-García, Igor Santos, Borja Sanz, Jose María Gómez Hidalgo, Pablo Garcia Bringas</i> | |
| OPEM: A Static-Dynamic Approach for Machine-Learning-Based Malware Detection | 271 |
| <i>Igor Santos, Jaime Devesa, Félix Brezo, Javier Nieves, Pablo Garcia Bringas</i> | |
| Adult Content Filtering through Compression-Based Text Classification ... | 281 |
| <i>Igor Santos, Patxi Galán-García, Aitor Santamaría-Ibirika, Borja Alonso-Isla, Iker Alabau-Sarasola, Pablo Garcia Bringas</i> | |
| PUMA: Permission Usage to Detect Malware in Android | 289 |
| <i>Borja Sanz, Igor Santos, Carlos Laorden, Xabier Ugarte-Pedrero, Pablo Garcia Bringas, Gonzalo Álvarez</i> | |

ICEUTE 2012**General Track****Application of Soft Computing Technologies toward Assessment and Skills Development 299**

*Ignacio Aliaga, Vicente Vera, Cristina González Losada,
 Álvaro Enrique García, Héctor Quintián, Emilio Corchado,
 Fanny Klett, Laura García-Hernández*

An Interactive Mathematica Book 311

J.A. Álvarez-Bermejo, J. Escoriza, J.A. López-Ramos, J. Peralta

Biorefinery Virtual Lab-Integrating E-learning Techniques and Theoretical Learning 321

*M.D. Redel-Macías, S. Pinzi, A.J. Cubero-Atienza, M.P. Dorado,
 M.P. Martínez-Jiménez*

Approaching System Administration as a Group Project in Computer Engineering Higher Education 331

*P.A. Gutiérrez, J. Sánchez-Monedero, C. Hervás-Martínez, M. Cruz-Ramírez,
 J.C. Fernández, F. Fernández-Navarro*

SOCO 2012**Special Sessions****Soft Computing Models for Control Theory & Applications in Electrical Engineering****Speed Control of A.C. Drive with Induction Motor Using Genetic Algorithm 341**

Pavel Brandstetter, Marek Dobrovsky

Applications of Artificial Neural Networks in Control of DC Drive 351

Pavel Brandstetter, Pavel Bilek

Energy Optimization of a Dynamic System Controller 361

Pavol Fedor, Daniela Perdukova

Optimal Input Vector Based Fuzzy Controller Rules Design 371

Pavol Fedor, Daniela Perdukova, Zelmira Ferkova

Correlation Methods of OCR Algorithm for Traffic Sign Detection Implementable in Microcontrollers 381

Radim Hercik, Roman Slaby, Zdenek Machacek, Jiri Koziorek

Takagi-Sugeno Fuzzy Model in Task of Controllers Design 391

Jana Nowaková, Miroslav Pokorný, Martin Pieš

| | |
|---|-----|
| Real-Time Estimation of Induction Motor Parameters Based on the Genetic Algorithm | 401 |
| <i>Petr Palacky, Petr Hudecek, Ales Havel</i> | |
| Comparison of Fuzzy Logic Based and Sliding Mode Based Controller for IM Drive Fed by Matrix Converter | 411 |
| <i>Jan Bauer, Stanislav Fligl</i> | |
| Discrete-Time Markov Chains in Reliability Analysis-Case Study | 421 |
| <i>Pavel Skalny, Bohumil Krajc</i> | |
| Genetic Algorithm Based Optimization of MGP-FIR Current Reference Generator for Active Power Filters | 429 |
| <i>Jakub Talla, Zdenek Peroutka, Seppo J. Ovaska, Josef Stehlik</i> | |
| Soft Computing Models for Biomedical Signals and Data Processing | |
| Correlation-Based Neural Gas for Visualizing Correlations between EEG Features | 439 |
| <i>Karla Štěpánová, Martin Macaš, Lenka Lhotská</i> | |
| Built-in Smartphone Accelerometer Motion Pattern Recognition Using Wavelet Transform | 447 |
| <i>Jakub Jirka, Michal Prauzek</i> | |
| Temporal Analysis of Remotely Sensed Data for the Assessment of COPD Patients' Health Status | 457 |
| <i>Sara Colantonio, Ovidio Salvetti</i> | |
| Encoding Time Series Data for Better Clustering Results | 467 |
| <i>Tomáš Bartoň, Pavel Kordík</i> | |
| Pattern Recognition in EEG Cognitive Signals Accelerated by GPU | 477 |
| <i>Pavel Dohnálek, Petr Gajdoš, Tomáš Peterek, Marek Penhaker</i> | |
| Advanced Soft Computing Methods in Computer Vision and Data Processing | |
| On the Potential of Fuzzy Rule-Based Ensemble Forecasting | 487 |
| <i>David Sikora, Martin Štěpnička, Lenka Vavříčková</i> | |
| Recognition of Damaged Letters Based on Mathematical Fuzzy Logic Analysis | 497 |
| <i>Vilem Novak, Hashim Habiballa</i> | |
| Image Reconstruction with Usage of the F-Transform | 507 |
| <i>Pavel Vlašánek, Irina Perfilieva</i> | |

| | |
|--|-----|
| Image Compression with Artificial Neural Networks | 515 |
| <i>Stephane Kouamo, Claude Tangha</i> | |
| Image Compression Methodology Based on Fuzzy Transform | 525 |
| <i>Petr Hurtik, Irina Perfilieva</i> | |
| Implementation of Background Knowledge and Properties Induced by Fuzzy Confirmation Measures in Apriori Algorithm | 533 |
| <i>Iva Tomanová, Jiří Kupka</i> | |
| Author Index | 543 |